

Zhenhua Liu, Ph.D.*(as of March, 2021)*

Associate Professor/Graduate Program Director of Nutrition,
School of Public Health and Health Sciences,
University of Massachusetts, Amherst, MA.
210C Chenoweth Laboratory Building
100 Holdsworth Way,
Amherst, MA, 01003

☎: 413-545-1075 | 📠: 413-545-1074: | ✉: zliu@nutrition.umass.edu

RESEARCH AREAS

Micronutrients (Folate and Vitamin D), Nutritional Epigenetics, Obesity and Inflammation, Cancer Prevention

EDUCATION & TRAINING

- **Postdoc, Nutrition & Cancer Prevention**, Tufts-New England Medical Center & Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University, Boston, MA, 2004-2007
- **Ph.D., Nutritional Biochemistry**, Auburn University, Auburn, AL, USA, 2003
- **M.S., Statistics-Life Science Option**, Auburn University, Auburn, USA, 2003
- **M.S., Animal Science**, China Agricultural University, Beijing, P.R. China, 1996
- **B.S., Animal Science & Veterinary Medicine**, Hunan Agricultural University, Hunan, P.R. China, 1993

ACADEMIC APPOINTMENTS

- 2018-Current **Associate Professor/Graduate Program Director of Nutrition**, School of Public Health and Health Sciences, University of Massachusetts, Amherst, MA
- 2012-Current **Adjunct Scientist**, Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University, Boston, MA
- 2012-2018 **Assistant Professor of Nutrition**, School of Public Health and Health Sciences, University of Massachusetts, Amherst, MA
- 2011-2012 **Scientist II & Assistant Professor**, Jean Mayer USDA Human Nutrition Research Center on Aging & Friedman School of Nutrition Science and Policy, Tufts University, Boston, MA
- 2007-2010 **Scientist III & Instructor**, Jean Mayer USDA Human Nutrition Research Center on Aging & Friedman School of Nutrition Science and Policy, Tufts University, Boston, MA
- 2004-2007 **Postdoctoral Associate**, New England Medical Center & Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University, Boston, MA

OTHER ACADEMIC APPOINTMENTS & PROFESSIONAL TRAININGS

Other Academic Appointments:

- 2020-Current **Faculty Member**, UMass Cancer Center, UMass Medical School, MA
- 2014-Current **Faculty Member**, Center for Bioactive Delivery and Model to Medicine Center, Institute for Applied Life Sciences, University of Massachusetts, Amherst, MA
- 2014-Current **Faculty Member**, Molecular and Cellular Biology Graduate Program, University of Massachusetts, Amherst
- 2014-2018 **Chair**, “Nutrients & Bioactives for Health” Research Cluster Department of Nutrition, School of Public Health and Health Sciences, University of Massachusetts, Amherst
- 2014-2017 **Adjunct Professor**, Dept of Molecular medicine, Hunan University, China
- 2011~2016 **“Taishan Scholar”** Institute of Food Science and Technology, Shandong Academy of Agricultural Sciences, Shandong, China.
- 2009-2012 **Investigator**, Nutrition and Cancer Program, Tufts Medical Center - Cancer Center, Boston, MA

Other Professional Trainings:

- 2019 **Breaking the Obesity-Cancer Link: New Targets and Strategies.** Webinar Workshop, NIH/NCI
- 2015 **The Impact of Obesity on Cancer Risk**, Webinar Workshop, NIH/NCI
- 2010 **Certificate of SAS® Advanced Programming**
- 2008 **Certificate of SAS® Base Programming**
- 2005 **A quantitative method for high-resolution analysis of CpG methylation.** Workshop. Dana-Faber Cancer Institute, Harvard University, Boston, MA

HONORS & MEMBERSHIPS

Awards & Honors:

- 2018 **Outstanding Teaching Award**, School of Public Health and Health Sciences, University of Massachusetts, Amherst
- 2012 **Bio-Serv Award** for Young Investigators, American Society of Nutrition
- 2008 **Hamish N. Munro Award** for Excellence in Postdoctoral Research, Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University
- 2002, 2003 **University Presidential Research Fellowship**, Auburn University

Professional Memberships:

- 2012-Current Member, **American Society for Nutrition**
- 2010-2012 Member, **American Association for Cancer Research**
- 2010 Member, **American Gastroenterology Association**
- 2007-Current Member, **The European Nutrigenomics Association**

2006-2009 Associate Member, **American Association for Cancer Research**

PUBLICATIONS

Peer-reviewed Journal Articles:

The URL for a complete list of my published work (>75 publications as of 2021) in MyBibliography (NIH/NCBI):

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1L7GiZMaNsuQa/bibliography/48619361/public/?sort=date&direction=descending>

1. Yook JS, You M, Kim Y, Zhou M, **Liu Z**, Kim YC, Lee J, Chung S. The thermogenic characteristics of adipocytes are dependent on the regulation of iron homeostasis. *Journal of Biological Chemistry*. [Accepted]
2. Zeng H, Safratowich BD, **Liu Z**, Bukowski MR, Ishaq SL. 2021. Adequacy of calcium and vitamin D reduces inflammation, β -catenin signaling, and dysbiotic *Parasutterella* bacteria in the colon of C57BL/6 mice fed a Western-style diet. *Journal of Nutritional Biochemistry*. [Accepted].
3. Lin TC, Germagian A, **Liu Z**. 2021. The NF- κ B Signaling and Wnt/ β -catenin Signaling in MCF-7 Breast Cancer Cells in Response to Bioactive Components from Mushroom *Antrodia Camphorata*. *The American Journal of Chinese Medicine*. 49(1):199-215. doi: 10.1142/S0192415X21500117. PMID: 33371814.
4. Li J, Kim S, Yu SY, Tang Y, Kim YC, Chung S, **Liu Z**. 2020. The genetic ablation of TNF- α attenuates Wnt-signaling and adiposity in high fat diet-induced obese mice. *Journal of Human Nutrition*. 4(1): 112-119. DOI: 10.36959/487/290.
5. Hossain S, **Liu Z**, Wood RJ. 2020. Association between histone deacetylase activity and vitamin D-dependent gene expressions in relation to sulforaphane in human colorectal cancer cell. *Journal of The Science of Food and Agriculture*. DOI: 10.1002/jsfa.10797. PMID: 32964464. [Epub ahead of print].
6. Zhang J, Tu M, **Liu Z**, Zhang G. 2020. Soluble epoxide hydrolase as a therapeutic target for obesity-induced disorders: roles of gut barrier function involved. *Prostaglandins, Leukotrienes and Essential Fatty Acids*. 162: 102180. DOI: 0.1016/j.plefa.2020.102180. PMID: 33038829.
7. Frederick ALM, Guo C, Meyer A, Yan L, Schneider SS, **Liu Z**. 2020. The influence of obesity on folate status, DNA methylation and cancer-related gene expression in normal breast tissues from premenopausal women. *Epigenetics*. doi: 10.1080/15592294.2020.1805687. PMID: 32749195.
8. Hossain S, **Liu Z**, Wood RJ. 2020. DICKKOPF-1 (DKK-1) Gene Associations in Human Cancers by Vitamin D and Sulforaphane. *J Cancer Sci Clin Ther* 2020; 4 (3): 237-244 Doi: 10.26502/jcsct.5079068.
9. Li Y, Li QX, Zhang N, **Liu Z**. 2020. Sunlight and vitamin D in the prevention of coronavirus disease (COVID-19) infection and mortality in the United States. *Research Square*. DOI:10.21203/rs.3.rs-32499/v1.
10. Zhang N, Cordeiro LS, **Liu Z**. 2020. Implications of the reverse associations between obesity prevalence and coronavirus disease (COVID-19) cases and related deaths in the United States. *medRxiv*, doi: <https://doi.org/10.1101/2020.06.09.20127035>.
11. Guo C, Kim SJ, Frederick AJM, Li J, Jin Y, Zeng H, Mason JB, **Liu Z**. 2020. Genetic ablation of tumor necrosis factor-alpha attenuates the promoted colonic Wnt-signaling in high fat diet-induced obese mice. *Journal of Nutritional Biochemistry*. 77:108302. doi: 10.1016/j.jnutbio.2019.108302. PMID: 31825818.

12. Hossain S, **Liu Z**, Wood RJ. 2020. Histone deacetylase activity and vitamin D-dependent gene expressions in relation to sulforaphane in human breast cancer cells. *Journal of Food Biochemistry*. 44(2):e13114. doi: 10.1111/jfbc.13114. PMID: 31846091
13. Zeng H, Larson KJ, Cheng WH, Bukowski MR, Safratowich BD, **Liu Z**, Hakkak R. 2020. Advanced liver steatosis accompanies an increase in hepatic inflammation, colonic, secondary bile acids and Lactobacillaceae/Lachnospiraceae bacteria in C57BL/6 mice fed a high-fat diet. *Journal of Nutritional Biochemistry*. 78:108336. doi: 10.1016/j.jnutbio.2019.108336. PMID: 32004929.
14. Pei R, Liu J, Martin DA, Valdez JC, Jeffery J, Barrett-Wilt GA, **Liu Z**, Bolling BW. 2019. Aronia Berry Supplementation Mitigates Inflammation in T Cell Transfer-Induced Colitis by Decreasing Oxidative Stress. *Nutrients*. 11(6). pii: E1316. doi: 10.3390/nu11061316. PMID: 31212794.
15. Li J, Frederick AM, Jin Y, Guo C, Xiao H, Wood RJ, **Liu Z**. 2019. The prevention of a high dose of vitamin D or its combination with sulforaphane on intestinal inflammation and tumorigenesis in *Apc^{1638N}* mice fed a high-fat diet. *Molecular Nutrition and Food Research*. 63(4):e1800824. doi: 10.1002/mnfr.201800824. PMID: 30447137.
16. Pei R, Martin DA, Smyth J, **Liu Z**, Bolling BW. 2019. Aronia berry consumption inhibits adoptive transfer colitis in mice by increasing Treg and skewing Th17 populations. *Molecular Nutrition and Food Research*. 63(5):e1800985. doi: 10.1002/mnfr.201800985. PMID: 30521111.
17. Ge Y, Liu W, Tao H, Zhang Y, Liu L, **Liu Z**, Qiu B, Xu T. 2018. Effect of industrial trans-fatty acids-enriched diet on gut microbiota of C57BL/6 mice. *European Journal Nutrition*. doi: 10.1007/s00394-018-1810-2. PMID: 30120538.
18. Guo X, Tang R, Yang S, Lu Y, Luo J, **Liu Z**. 2018. Rutin and its combination with inulin attenuates gut dysbiosis, the inflammatory status and endoplasmic reticulum stress in Paneth cell of obese mice induced by high-fat diet. *Frontiers in Microbiology*. 9:2651. doi: 10.3389/fmicb.2018.02651.
19. Pfalzer AC, Leung K, Crott JW, Kim SJ, Tai AK, Parnell LD, Kamanu FK, **Liu Z**, Rogers G, Shea MK, Garcia PE, Mason JB. 2018. Incremental elevations of TNF- α and IL-6 in the human colon and pro-cancerous changes in the mucosal transcriptome accompany adiposity. *Cancer Epidemiol Biomarkers Prev*. 27(12):1416-1423. doi: 10.1158/1055-9965.EPI-18-0121. PMID: 30291114
20. Liu W, Zhang Y, Qiu B, Fan S, Ding H, **Liu Z**. 2018. Quinoa whole grain diet compromises the changes of gut microbiota and colonic colitis induced by dextran Sulfate sodium in C57BL/6 mice. *Scientific Reports*. 8(1):14916. PMID: 30297695 PMCID: PMC6175902. doi: 10.1038/s41598-018-33092-9
21. Yang H, Wang W, Romano KA, Gu M, Sanidad KZ, Kim D, Yang J, Schmidt B, Panigrahy D, Pei R, Martin DA, Ozay EI, Wang Y, Song M, Bolling BW, Xiao H, Minter LM, Yang GY, **Liu Z**, Rey FE, Zhang G. 2018. A common antimicrobial additive increases colonic inflammation and colitis-associated colon tumorigenesis in mice. *Science Translational Medicine*. 10(443). pii: ean4116. doi: 10.1126/scitranslmed.aan4116. PMID: 29848663
22. Wang W, Yang J, Zhang J, Wang Y, Hwang SH, Qi W, Wan D, Kim D, Sun J, Sanidad KZ, Yang H, Park Y, Liu JY, Zhao X, Zheng X, **Liu Z**, Hammock BD, Zhang G. 2018. Lipidomic profiling reveals soluble epoxide hydrolase as a therapeutic target of obesity-induced colonic inflammation. *Proc Natl Acad Sci U S A*. 115:5283-5288. doi: 10.1073/pnas.1721711115. PMID: 29717038. PMCID: PMC5960306.

23. Xu T, Li J, Zou J, Qiu B, Liu W, Lin X, Li D, **Liu Z**, Du F. 2018. Rat Small Intestinal Mucosal Epithelial Cells Absorb Dietary 1,3-Diacylglycerol via Phosphatidic Acid Pathways. *Lipids*. 53:335-344. PMID: 29701264
24. Kadappan AS, Chi Guo C, Gumus CE, Bessey A, Wood RJ, McClements DJ, **Liu Z**. 2018. The efficacy of nanoemulsion-based delivery to improve vitamin D absorption: comparison of in vitro and in vivo studies. *Molecular Nutrition and Food Research*. 62(4). doi: 10.1002/mnfr.201700836. PMID: 29266712
25. Li J, Yan Y, Li D, Li X, Lin X, **Liu Z**, Xu T, Du F. 2018. Nephroprotective effects of diacylglycerol on diabetic nephropathy in type 2 diabetic rats. *Experimental and Therapeutic Medicine*. 15:1918-1926. PMID: 29434785
26. Martin DA, Smyth JA, **Liu Z**, Bolling BW. 2018. Aronia berry (*Aronia mitschurinii* 'Viking') inhibits colitis in mice and inhibits T cell tumour necrosis factor- α secretion. *Journal of Functional Foods*. 44:48-57.
27. Zeng H, Ishaq SL, **Liu Z**, Bukowski MR. 2018. Colonic aberrant crypt formation accompanies an increase of opportunistic pathogenic bacteria in C57BL/6 mice fed a high-fat diet. *Journal of Nutritional Biochemistry*. 54:18-27. PMID: 29223827.
28. Li J, Goh CE, Demmer RT, Whitcomb BW, Du P, **Liu Z**. 2017. Association between Serum Folate and Insulin Resistance among U.S. Nondiabetic Adults. *Scientific Reports*. 2017.7(1):9187. PMID: 28835661 PMCID: PMC5569086
29. Wang W, Yang J, Nimiya Y, Lee KS, Sanidad K, Qi W, Sukamtoh E, Park Y, **Liu Z**, and Zhang G 2017. ω -3 polyunsaturated fatty acids and their cytochrome P450-derived metabolites suppress colorectal tumor development in mice. *Journal Nutritional Biochemistry*. 48:29-35.
30. Yang H, Du Z, Wang W, Song M, Sanidad K, Sukamtoh E, Zheng J, Tian L, Xiao H, **Liu Z**, Zhang G. 2017. Structure–Activity Relationship of Curcumin: Role of the Methoxy Group in Anti-inflammatory and Anticolitis Effects of Curcumin. *Journal Agricultural Food Chemistry*. 65(22):4509-4515.
31. Roubert A, Gregory K, Li Y, Pfalzer AC, Li J, Schneider SS, Wood RJ, **Liu Z**. 2017. The influence of tumor necrosis factor- α on the tumorigenic Wnt-signaling pathway in human mammary tissue from obese women. *Oncotarget*. 8(22):36127-36136. PMID: 28402277 PMCID: PMC5039360
32. Guo X, Li J, Tang R, Zhang G, Zeng H, Wood RJ, **Liu Z**. 2017. High fat diet alters gut microbiota and the expression of Paneth cell-antimicrobial peptides preceding changes of circulating inflammatory cytokines. *Mediators of Inflammation*. 2017:9474896. doi: 10.1155/2017/9474896.
33. Liu W, Crott JW, Lyu L, Pfalzer AC, Li J, Choi SW, Yang Y, Mason JB, **Liu Z**. 2016. Diet- and Genetically-induced Obesity Produces Alterations in the Microbiome, Inflammation and Wnt Pathway in the Intestine of Apc+/*1638N* Mice: Comparisons and Contrasts. *Journal of Cancer*. 7(13): 1780-1790. PMID: 27698916 PMCID: PMC5039360
34. Song MA, Brasky TM, Marian C, Weng DY, Taslim C, Llanos AA, Dumitrescu RG, **Liu Z**, Mason JB, Spear SL, Kallakury BV, Freudenheim JL, Shields PG. 2016. Genetic variation in one-carbon metabolism in relation to genome-wide DNA methylation in breast tissue from healthy women. *Carcinogenesis*. 37(5):471–480. PMID: 26961134.

35. Pfalzer AC, Kamanu FK, Parnell LD, Tai AK, **Liu Z**, Mason JB, and Crott JW. 2016. Interactions between the colonic transcriptome, metabolome and microbiome in mouse models of obesity-induced intestinal cancer. *Physical Genomics*. 48(8):545-53.
36. Sabet JA, Park LK, Iyer L, Tai AK, Koh GY, Pfalzer AC, Parnell LD, Mason JB, **Liu Z**, Byun AJ, Crott JW. 2016. Paternal B Vitamin Intake Is a Determinant of Growth, Hepatic Lipid Metabolism and Intestinal Tumor Volume in Female Apc1638N Mouse Offspring. *Plos One*. 11(3):e0151579.
37. Lu L, Guo J, Li S, Li A, Zhang L, **Liu Z**, Luo X. 2015. Influence of Phytase Transgenic Corn on the Intestinal Microflora and the Fate of Transgenic DNA and Protein in Digesta and Tissues of Broilers. *PLoS One*. 10(11):e0143408.
38. Llanos AA, Marian C, Brasky TM, Dumitrescu RG, **Liu Z**, Mason JB, Makambi KH, Spear SL, Kallakury BV, Freudenheim JL, Shields PG. 2015. Associations between genetic variation in one-carbon metabolism and LINE-1 DNA methylation in histologically normal breast tissues. *Epigenetics*. 10: 727-735. PMID: 26090795 PMCID: PMC4623023
39. Pfalzer AC, Nesbeth PD, Parnell LD, Iyer LK, **Liu Z**, Kane AV, Chen CY, Tai AK, Bowman TA, Obin MS, Mason JB, Greenberg AS, Choi SW, Selhub J, Paul L, Crott JW. 2015. Diet- and Genetically-Induced Obesity Differentially Affect the Fecal Microbiome and Metabolome in Apc1638N Mice. *PLoS One*. 10(8):e0135758. PMID: 26284788 PMCID: PMC4540493
40. Choi SW, Tammen SA, **Liu Z**, Friso S. 2015. A lifelong exposure to a Western-style diet, but not aging, alters global DNA methylation in mouse colon. *Nutrition Research and Practice*. 9:358-363
41. **Liu Z**, Ke Y. 2015. Inflammation Driven Activation of Wnt Pathway: A Potential Mechanism Responsible for Obesity-associated Colorectal Cancer. *Obesity Research*. 1:10-15
42. Bird JK, Ronnenberg, AG, Choi, SW, Du, F, Mason, JB, **Liu Z**. 2015. Obesity is associated with an increased red blood cell folate despite lower dietary intakes and serum concentrations. *Journal of Nutrition*. 145:79-86. PMID: 25527662. PMCID: PMC6619680
43. Lee B, Yang Y, **Liu Z**. 2015. Synergistic Mediation of Sulforaphane and Vitamin D on the Wnt-signaling Pathway. *Journal of Nature and Science*. 1(2):e36
44. Llanos AA, Dumitrescu RG, Brasky TM, **Liu Z**, Mason JB, Marian C, Makambi KH, Spear SL, Kallakury BVS, Freudenheim JL, and Shields PG. 2015. Relationships among Folate, Alcohol Consumption, Gene Variants in One-Carbon Metabolism, and p16INK4a Methylation and Expression in Healthy Breast Tissues. *Carcinogenesis*. 36: 60-67.
45. Tammen SA, Dolnikowski GG, Ausman LM, **Liu Z**, Kim K C, Friso S, Choi SW. 2014. Aging Alters Hepatic DNA Hydroxymethylation, as Measured by Liquid chromatography/Mass Spectrometry. *J Cancer Prev*. 19:301-308
46. Tammen SA, Dolnikowski GG, Ausman LM, **Liu Z**, Sauer J, Friso S, Choi SW 2014. Aging and Alcohol Interact to Alter Hepatic DNA Hydroxymethylation. *Alcohol Clin Exp Res*. 38:2178-85. PMCID: PMC4146686
47. Selhub J, Byun A, **Liu Z**, Mason JB, Bronson RT, Crott JW. 2013. Dietary vitamin B6 intake modulates colonic inflammation in the IL10^{-/-} model of inflammatory bowel disease. *Journal of Nutritional Biochemistry*. 24: 2138-43. PMID: 24183308 PMCID: PMC4199223

48. **Liu Z**, Brooks RS, Ciappio ED, Kim SJ, Crott JW, Bennett G, Greenberg AS, Mason JB. 2012. Diet-induced obesity elevates colonic TNF- α in mice and is accompanied by an activation of Wnt signaling: a mechanism for obesity-associated colorectal cancer. *Journal of Nutritional Biochemistry*. 23: 1207-13. PMID: 22209007. PMCID: PMC4142203.
49. Ciappio, E.D, **Liu, Z.**, Brooks, R.S., Mason, J.B. Bronson, R.T. and Crott, J.W. 2012. Maternal B-vitamin supplementation from preconception through weaning suppresses intestinal tumorigenesis in Apc+/1638N mouse offspring. *Gut*. 60: 1695-1702. PMID: 21659408 PMCID: PMC4193343.
50. **Liu Z**. 2012. One-Carbon Vitamins, Epigenetic/Genetic Integrity and Colon Cancer: Research is Needed to Understand the Effect on Tumorigenic Signaling Pathways. *Vitamins and Minerals*. 1:e112. doi:10.4172/2167-0390.1000e112
51. **Liu, Z**, Ciappio, E. D., Crott, J. W., Brook, R. S., Mason, J. B. 2011. Mild inadequacy in multiple one-carbon vitamins elevates Wnt-signaling and promotes intestinal tumorigenesis in the BAT-LacZx \times Apc1638N mouse model. *FASEB Journal*. 25:3136-3145. PMCID: PMC3157689.
52. Flood, A., Mason, J. B., **Liu, Z.**, Cash, B. D., Schatzkin, A., Schoenfeld, P. S., Cross, A. J. 2011. Concentration of folate in colorectal tissue biopsies predicts prevalence of adenomatous polyps. *Gut*, 60:66-72. PMID: 21068136. PMCID: PMC3500908.
53. Protiva P, Mason JB, **Liu Z**, Hopkins ME, Nelson C, Marshall JR, Lambrecht RW, Pendyala S, Kopelovich L, Kim M, Kleinstein SH, Laird PW, Lipkin M, Holt PR. 2011. Altered Folate Availability Modifies the Molecular Environment of the Human Colorectum: Implications for Colorectal Carcinogenesis. *Cancer Prevention Research*, 4:530-43. PMID: 21321062.
54. Kim KC, Jang H, Sauer J, Zimmerly EM, **Liu Z**, Chanson A, Smith ED, Frisco S, Choi SW. 2011. Folate supplementation differently affects uracil content in DNA in the mice colon and liver. *British Journal of Nutrition*, 105:688-93. PMID: 21251336 [PubMed - indexed for MEDLINE]
55. Chen CY, Crott JW, **Liu Z**, Smith DE. 2010. Fructose and saturated fats predispose hyperinsulinemia in lean male rat offspring. *Europe Journal Nutrition*, 49:337-43. PMID: 20888584.
56. Sauer, J., H. Jang, E. M. Zimmerly, K. C. Kim, **Z. Liu**, A. Chanson, D. E. Smith, J. B. Mason, S. Friso, S. W. Choi. 2010. Ageing, chronic alcohol consumption and folate are determinants of genomic DNA methylation, p16 promoter methylation and the expression of p16 in the mouse colon. *British Journal of Nutrition*. 104:24-30
57. Chanson, A., L. D. Parnell, E. D. Ciappio, **Z. Liu**, J. W. Crott, K. L. Tucker, J. B. Mason. 2009. Polymorphisms in uracil-processing genes, but not one-carbon nutrients, are associated with altered DNA uracil concentrations in an urban Puerto Rican population. *The American Journal of Clinical Nutrition*. 89:1927-36.
58. **Liu, Z**, S. Choi, J. W. Crott, J. B. 2008. Mason. Multiple B-vitamin inadequacy amplifies alterations induced by folate depletion in p53 expression and its downstream effector MDM2. *International Journal of Cancer*. 123: 519-525.
59. Mason, J. B., S. Choi, **Z. Liu**. 2008. One-carbon micronutrients and age modulate the effects of folate on colorectal carcinogenesis. *Nutrition Reviews*. 66: S15-S17.
60. DeVos L, A. Chanson, **Z. Liu**, E. D. Ciappio, L. D. Parnell, J. B. Mason, K. L. Tucker, J. W. Crott. 2008. Associations between single nucleotide polymorphisms in folate uptake

- and metabolizing genes with blood folate, homocysteine, and DNA uracil concentrations. *The American Journal of Clinical Nutrition*. 88:1149-1158.
61. Crott, J. W., **Z. Liu**, M. K. Keyes, S. Choi, H. Jang, M. P. Moyer, J. B. Mason. 2008. Moderate folate depletion modulates the expression of selected genes involved in cell cycle, intracellular signaling, and folate uptake in human colonic epithelial cell lines. *Journal of Nutritional Biochemistry*. 19: 328-335.
 62. **Liu, Z.**, S. Choi, J. W. Crott, M. K. Keyes, H. Jang, D. E. Smith, M. Kim, P. W. Laird, R. Bronson, J. B. Mason. 2007. Mild depletion of dietary folate combined with other B-vitamins alters multiple components of the Wnt pathway in the mouse colon. *Journal of Nutrition*, 137: 2701-2708. PMID: 18029487
 63. Keys, M. K, H. Jang, J. B. Mason, **Z. Liu**, J. W. Crott, D. E. Smith, S. Friso, S. Choi. 2007. Elder age and dietary folate are interactive determinants of genomic and p16-specific DNA methylation in the mouse colon. *Journal of Nutrition*. 137:1713-1717.
 64. Crott, J. W., **Z. Liu**, **S. Choi**, J. B. Mason. 2007. Folate depletion in human lymphocytes up-regulates p53 expression despite marked induction of strand breaks in exons 5–8 of the gene. *Mutation Research*, 626:171-179.
 65. Gabriel, H. E., J. W. Crott, G. E. Dallal, S. Choi, H. Ghandour, M. K. Keyes, H. Jang, **Z. Liu**, M. Nadeau, A. Johnston, D. Mager, and J. B. Mason. 2006. Chronic cigarette smoking is associated with diminished folate status, altered folate form distribution and increased genetic damage in the buccal mucosa of healthy adults. *The American Journal of Clinic Nutrition*, 83:835-841.
 66. Gabriel, H. E., **Z. Liu**, J. W. Crott, S. Choi, B. C. Song, J. B. Mason, E. J. Johnson. 2006. Carotenoid, retinoid and tocopherol concentrations in serum and buccal mucosa of smokers is altered in a manner unrelated to diet. *Cancer Epidemiology Biomarkers & Prevention*, 15:993-999.
 67. **Liu, Z.**, A. Bateman, M.M. Bryant, B. Zinner, and D. A. Roland, Sr. 2005. Bioavailability comparison of DL-methionine and DL-methionine hydroxy analogue for layers on an unequal molar basis. *Journal of Applied Poultry Research*, 14:569-575.
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 69. Bateman, A., **Z. Liu**, M.M. Bryant, G. Wu and D.A. Roland, Sr. 2005. Explanation on how to interpret properly the bioefficacy of methionine hydroxy analogue-free acid relative to dl-methionine estimated by regression models in laying hens. *International Journal of Poultry Science*, 4:280-285.
 70. **Liu, Z.**, G. Wu, M.M. Bryant, and D.A. Roland, Sr. 2005. Influence of added synthetic lysine in low protein diets with the methionine+cysteine/lysine ratio maintained at 0.75. *Journal of Applied Poultry Research*, 14:174-182.
 71. Bateman, A., **Z. Liu**, and David A. Roland, Sr 2005. Bioefficacy determination of methionine hydroxy analog-free acid relative to DL-methionine in laying hen diets with limited methionine using different regression models. *International journal of Poultry Science*, 4:628-632.
 72. **Liu, Z.**, M.M. Bryant and D.A. Roland, Sr. 2005. Layer performance and phytase retention as influenced by copper sulfate pentahydrate and tribasic copper chloride. *Journal of Applied Poultry Research*, 14:499-505.

73. Wu, G., **Z. Liu**, M.M. Bryant, and D.A. Roland, Sr. 2005. Performance comparison and nutritional requirements of five commercial layer strains in Phase IV. *International Journal of Poultry Science*, 4:182-186.
74. **Liu, Z.**, A. Bateman, S. S. Sohail, B. Zinner, and D. A. Roland, Sr. 2004. Statistical sensitivity required to detect any potential difference of bioavailability between DL-methionine and DL-methionine hydroxy analogue in layers. *International Journal of Poultry Science*, 3:697-703.
75. Guo, Z.Y., J. J. Giambrone, **Z. Liu**, T. Dormitorio and H. Z. Wu. 2004. Effect of in ovo administered reovirus vaccines on the cell-mediated immune response of Specific-Pathogen-Free chickens. *Avian Diseases*. 48:224-228.
76. **Liu, Z.**, G. Wu, M.M. Bryant, and D.A. Roland, Sr. 2004. Influence of added synthetic lysine for first phase second cycle commercial leghorns with the methionine+cysteine/lysine ratio maintained at 0.75. *International Journal of Poultry Science*, 3:220-227.
77. **Liu, Z.**, M.M. Bryant, and D.A. Roland, Sr. 2004. Bioavailability estimation of DL-methionine hydroxy analogue relative to DL-methionine in layers fed milo-soybean diets using different regression models. *Journal of Applied Poultry Research*, 13: 461-467.
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Book Chapters:

Liu Z, Tammen SA, Friso S and Choi SW. 2013. Crosstalk between microRNAs and Epigenetics: From the Nutritional Perspective. In *microRNAs in Toxicology and Medicine* (ed Sahu SC), 319-340. John Wiley & Sons, Ltd. New York, NY.

Abstracts in Conferences:

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2. Yu SY, **Liu Z**, Chung S, Kim YC. 2021. Obesity-induced tumor necrosis factor alpha suppresses in vivo and in vitro retinoic acid synthesis and fatty acid oxidation in adipose tissue. *Nutrition 2021*, American Society of Nutrition (Virtual Meeting).
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TEACHING

NUTRITN130H: Nutrition and a Healthy Lifestyle

This course is tailored for undergraduate students in the UMass Commonwealth Honors College who are interested in nutrition and health. It provides an introduction to the science of nutrition as it applies to a healthy lifestyle. The emphasis in this course will be on the physiological roles that nutrients (carbohydrates, lipids, proteins, vitamins, minerals, and water, as well as dietary bioactive components) play in health and disease prevention.

NUTRITN 597J: Nutritional Genomics

This course, which consists of three modules (Nutritional Genomics, Nutritional Epigenomics, and Nutritional Metagenomics), will offer a state of science approach to unravel the effects of nutrition on health.

NUTRITN 597S: Nutrition and Cancer Prevention

This course is keyed towards senior undergraduates and graduate students who are interested in explore the extent to which nutrition, food and physical activity modify the risk of cancer, one of the most pressing challenges facing the public health worldwide.

NUTRITN 714: Vitamins and Minerals

This course is designed to teach students' knowledge of the biochemistry, biological functions in development and diseases, and public health significance of micronutrients, including vitamins, minerals and dietary bioactive components (DBC's).

NUTRITN 715: Advanced Nutrition: Vitamins and Minerals

This course is designed to advance students' knowledge regarding the biochemical, physiological & molecular aspects of vitamins and minerals. It focuses on critical reviews, evaluations and discussions of most currently research articles pertaining to the advances in micronutrients and health

NUTRITN 793: Graduate Seminar

This course is for nutrition graduate students and others interested in discussing and presenting current topics in nutrition and health.